WHAT IS CLAIMED IS

1. A superconducting driver circuit for voltage amplification comprising: a superconducting flux quantum interference device in a first stage constructing a closed loop having as components two superconducting junctions and an inductor; a superconducting flux quantum interference device in a second stage constructing a closed loop having as components two superconducting junctions and an inductor by sharing said inductor; and a superconducting flux quantum interference device in a third stage constructing a closed loop having as components two superconducting junctions and an inductor by sharing the inductor of said superconducting flux quantum interference device in said second stage, wherein the superconducting junctions of the superconducting flux quantum interference devices toward a lower stage of the superconducting junctions of the superconducting flux quantum interference devices in said respective stages have a larger critical current value, a predetermined bias current is supplied to the superconducting junctions of the superconducting flux quantum interference devices in said respective stages, and a flux quantum signal is inputted to the superconducting flux quantum interference device in the first stage to obtain an output voltage from the superconducting flux quantum interference device in the third stage.

2. The superconducting driver circuit for voltage amplification according to claim 1, wherein the superconducting flux quantum interference devices are provided in four or more stages, and an output voltage is obtained from a superconducting flux quantum interference device in the uppermost stage.

3. A superconducting driver circuit for voltage amplification comprising: superconducting flux quantum interference devices in a first stage in which a plurality of superconducting flux quantum interference devices each constructing a closed loop having as components two superconducting junctions and an inductor are arrayed in parallel so as to share an adjacent superconducting junction; superconducting flux quantum interference devices in a second stage in which a plurality of superconducting flux quantum interference devices each constructing a closed loop having as components two superconducting junctions and an inductor are arrayed in parallel in number one fewer than the superconducting flux quantum interference devices in the first stage so as to share said inductor and to share the adjacent superconducting junction; and superconducting flux quantum interference devices in a third stage in which a plurality of superconducting flux quantum interference devices each constructing a closed loop having as components two superconducting junctions and an inductor are arrayed in parallel in number one fewer than the superconducting flux

quantum interference devices in the second stage so as to share the inductor of said superconducting flux quantum interference device in the second stage and to share the adjacent superconducting junction, wherein the superconducting junctions of the superconducting flux quantum interference devices in said respective stages have almost equal critical current values, a predetermined bias current is supplied to the superconducting junctions of the superconducting flux quantum interference devices in said respective stages, and a flux quantum signal is inputted to the superconducting flux quantum interference devices in the first stage to obtain an output voltage from the superconducting flux quantum interference devices in the third stage.

4. The superconducting driver circuit for voltage amplification according to claim 3, wherein the superconducting flux quantum interference devices are provided in four or more stages, and an output voltage is obtained from the superconducting flux quantum interference devices in the uppermost stage.

5. The superconducting driver circuit for voltage amplification according to claim 3, wherein the number of squids in the uppermost stage is one, and the number of superconducting flux quantum interference devices constructing the respective stages is increased by one toward a lower stage.

6. A superconducting driver circuit for voltage

amplification comprising: a superconducting flux quantum interference device in a first stage constructing a closed loop having as components two superconducting junctions and an inductor; a superconducting flux quantum interference device in a second stage constructing a closed loop having as components two superconducting junctions and an inductor by sharing said inductor; and a superconducting flux quantum interference device in a third stage constructing a closed loop having as components two superconducting junctions and an inductor by sharing the inductor of said superconducting flux quantum interference device in said second stage, wherein the superconducting junctions of the superconducting flux quantum interference devices toward a lower stage of the superconducting junctions of the superconducting flux quantum interference devices in said respective stages have a larger critical current value, a predetermined bias current is supplied to the superconducting junctions of the superconducting flux quantum interference devices in said respective stages except for the superconducting junctions of the superconducting flux quantum interference device in the first stage, and a flux quantum signal is inputted to two superconducting junctions of the superconducting flux quantum interference device in the first stage to obtain an output voltage from the superconducting flux quantum interference device in the third stage.

7. The superconducting driver circuit for voltage

amplification according to claim 6, wherein the superconducting flux quantum interference devices are provided in four or more stages, and an output voltage is obtained from a superconducting flux quantum interference device in the uppermost stage.

8. The superconducting driver circuit for voltage amplification according to claim 6, wherein one input signal is provided to one superconducting junction of the superconducting flux quantum interference device in the first stage, another input signal is provided to another superconducting junction, the superconducting driver circuit is switched to the voltage state by one input signal to hold a voltage state, and another input signal returns the superconducting driver circuit to a zero-voltage state.

9. A superconducting circuit comprising: a superconducting flux quantum circuit performing predetermined signal processing using a flux quantum as a signal carrier; a superconducting flux quantum-voltage converter circuit which inputs a flux quantum signal outputted from the superconducting flux quantum circuit to output, for each flux quantum signal input, a repeat state of a state that a flux quantum train exists and a state that a flux quantum train does not exist; and a superconducting driver circuit for voltage amplification receiving as an input the output of the superconducting flux quantum-voltage converter circuit.

10. The superconducting circuit according to claim 9,

wherein a circuit which multiplies a flux quantum inputted as the output of said superconducting flux quantum-voltage converter circuit to be dividedly flowed to two circuits for being inputted to one output circuit is inserted between the superconducting flux quantum-voltage converter circuit and the superconducting driver circuit for voltage amplification.